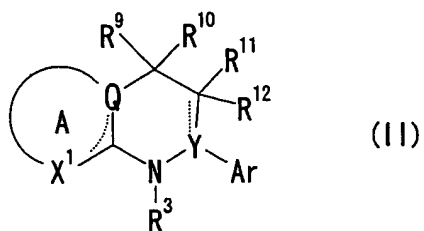


CLAIMS

1. A compound of the formula (II):



wherein ring A is an optionally substituted 5- to 7-
5 membered ring;

Q is C, CR⁵ (wherein R⁵ is H, an optionally substituted
hydrocarbon group, an optionally substituted hydroxyl group,
an optionally substituted amino group, an optionally
substituted thiol group, cyano group, a halogen atom, an
10 optionally substituted heterocyclic group, or a group of
the formula: -Z¹-Z² (wherein -Z¹- is -CO-, -CS-, -SO- or -
SO₂-, and Z² is an optionally substituted hydrocarbon group,
an optionally substituted heterocyclic group, an optionally
substituted hydroxyl group, or an optionally substituted
15 amino group)), or N;

X¹ is CR¹ (wherein R¹ is H, an optionally substituted
hydrocarbon group, an optionally substituted hydroxyl group,
an optionally substituted amino group, an optionally
substituted thiol group, cyano group, a halogen atom, an
20 optionally substituted heterocyclic group, or a group of
the formula: -Z¹-Z² (wherein -Z¹- and Z² are as defined
above)), CR¹R² (wherein R¹ is as defined above, and R² is H,

or an optionally substituted hydrocarbon group), N, or NR^{13}
 (wherein R^{13} is H, an optionally substituted hydrocarbon
 group, an optionally substituted hydroxyl group, an
 optionally substituted amino group, an optionally
 5 substituted heterocyclic group, or a group of the formula:
 $-\text{Z}^1-\text{Z}^2$ (wherein $-\text{Z}^1-$ and Z^2 are as defined above));

R^3 is H, an optionally substituted hydrocarbon group, an
 optionally substituted hydroxyl group, an optionally
 substituted amino group, an optionally substituted
 10 heterocyclic group, or a group of the formula: $-\text{Z}^1-\text{Z}^2$
 (wherein $-\text{Z}^1-$ and Z^2 are as defined above);

Y is C, CR^4 (wherein R^4 is H, an optionally substituted
 hydrocarbon group, an optionally substituted hydroxyl group,
 an optionally substituted amino group, an optionally
 15 substituted thiol group, cyano group, a halogen atom, an
 optionally substituted heterocyclic group, or a group of
 the formula: $-\text{Z}^1-\text{Z}^2$ (wherein $-\text{Z}^1-$ and Z^2 are as defined
 above)), or N;

Ar is an optionally substituted cyclic group;

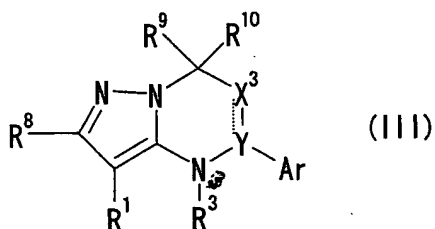
20 R^9 and R^{10} are the same or different and are H, an
 optionally substituted hydrocarbon group, an optionally
 substituted hydroxyl group, an optionally substituted amino
 group, an optionally substituted thiol group, cyano group,
 a halogen atom, an optionally substituted heterocyclic
 25 group, or a group of the formula: $-\text{Z}^1-\text{Z}^2$ (wherein $-\text{Z}^1-$ and

Z^2 are as defined above); and R^{11} and R^{12} are the same or different and are H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ is $-CS-$, $-SO-$ or $-SO_2-$, and Z^2 is as defined above); or R^9 and R^{10} , or R^{11} and R^{12} may be combined to form an oxo group, methylene group or a ring; or R^{10} and R^{11} may be combined to form a ring; and - - - is a single bond or a double bond; provided that

- (1) when ring A is a 6-membered ring and Q is C or CR^5 , X^1 is $C-Z^1-Z^2$, $C(-Z^1-Z^2)R^2$ or $N-Z^1-Z^2$, and both R^9 and R^{10} are not H, or R^9 and R^{10} are not combined to form an oxo group, or R^{10} and R^{11} are not combined to form a 5-membered ring,
- (2) when ring A is a 6-membered ring and Q is N, X^1 is $C-Z^1-Z^2$, $C(-Z^1-Z^2)R^2$ or $N-Z^1-Z^2$, and R^9 and R^{10} are not combined to form an oxo group,
- (3) when ring A is a 5-membered ring and Q is C or CR^5 , X^1 is $C-Z^1-Z^2$, $C(-Z^1-Z^2)R^2$ or $N-Z^1-Z^2$, and Z^2 is an optionally substituted amino group, and
- (4) when ring A is a 5-membered ring and Q is N, at least one of R^9 and R^{10} is $CHR^{15}R^{16}$ (wherein at least one of R^{15} and R^{16} are the same or different and are H, an optionally

substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above)) and the other is other than an optionally substituted phenyl group; or a salt thereof.

2. A compound of the formula (III):



wherein R^1 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted thiol group, an optionally substituted amino group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ is $-CO-$, $-CS-$, $-SO-$ or $-SO_2-$, and Z^2 is an optionally substituted hydrocarbon group, an optionally substituted heterocyclic group, an optionally substituted hydroxyl group, or an optionally substituted amino group);

R^3 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted

heterocyclic group, or a group of the formula: $-Z^1-Z^2$
(wherein $-Z^1-$ and Z^2 are as defined above);

Y is C, CR^4 (wherein R^4 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group,
5 an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above)) or N;

10 R^8 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula:
15 $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above);

Ar is an optionally substituted cyclic group;

R^9 and R^{10} are the same or different and are H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino
20 group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above), or R^9 and R^{10} may be combined to form an oxo group, methylene group or a ring;

25 X^3 is a bond, oxygen atom, an optionally oxidized sulfur

atom, N, NR^{7'} (wherein R^{7'} is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted heterocyclic group, or a group of the formula - Z^{1'}-Z² (wherein -Z^{1'}- is -CS-, -SO- or -SO₂-, and Z² is as defined above)), or an optionally substituted bivalent C₁₋₂ hydrocarbon group; and

- - - is a single bond or a double bond;

provided that at least one of R⁹ and R¹⁰ is CHR¹⁵R¹⁶ (wherein R¹⁵ and R¹⁶ are the same or different and are H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: -Z¹-Z² (wherein -Z¹- and Z² are as defined above)) and the other is other than an optionally substituted phenyl group; or a salt thereof.

3. The compound according to claim 1 or 2, wherein R¹ is

- (1) an optionally substituted heterocyclic group, or
- (2) a group of the formula: -Z¹-Z² (wherein -Z¹- is -CO-, -CS-, -SO- or -SO₂-, and Z² is an optionally substituted hydrocarbon group, an optionally substituted heterocyclic group, an optionally substituted hydroxyl group, or an optionally substituted amino group).

4. The compound according to claim 3, wherein Z^1 is -CO- and Z^2 is an optionally substituted hydroxyl group or an optionally substituted amino group.

5 5. The compound according to claim 2, wherein R^3 is H, a C_{1-6} alkyl group or a C_{7-14} aralkyl group.

6. The compound according to claim 2, wherein R^8 is H, a C_{1-6} alkyl group, a C_{1-6} alkylthio group or a C_{1-6} alkoxy group which may be substituted with hydroxyl group.

10 7. The compound according to claim 1 or 2, wherein R^9 and R^{10} are the same or different and are a C_{1-6} alkyl group or R^9 and R^{10} are combined each other to form a ring.

8. The compound according to claim 2, wherein R^1 is a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ is -CO-, -CS-, -SO- or -SO₂-, and Z^2 is an optionally substituted hydrocarbon group, an optionally substituted heterocyclic group, an optionally substituted hydroxyl group, or an optionally substituted amino group); R^3 is H; Ar is an optionally substituted aromatic ring group; X^3 is $CR^{11}R^{12}$ (wherein R^{11} and R^{12} are the same or different and are H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above), or R^{11} and R^{12} may be combined to

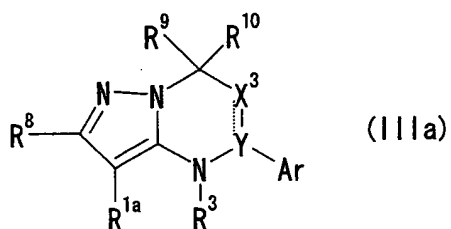
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form an oxo group, methylene group or a ring); and R^9 and R^{10} are the same or different and a C_{1-6} alkyl group, or R^9 and R^{10} may be combined to form a ring.

9. The compound according to claim 8, wherein R^1 is
5 an optionally substituted carbamoyl group.

10. The compound according to claim 9, wherein R^1 is
a group of the formula: $-\text{CONR}^{20}(\text{CR}^{21}\text{R}^{22}\text{R}^{23})$ (wherein R^{20} is H
or an optionally substituted hydrocarbon group, and R^{21} , R^{22} ,
and R^{23} are the same or different and are an optionally
10 substituted hydrocarbon group or an optionally substituted
heterocyclic group, or R^{20} and R^{21} may be combined to form a
ring).

11. A compound of the formula (IIIa):



15 wherein R^{1a} is (1) an optionally substituted heterocyclic
group, or

(2) a group of the formula: $-\text{Z}^{1a}-\text{Z}^{2a}$ (wherein $-\text{Z}^{1a}-$ is $-\text{CO}-$,
 $-\text{CS}-$, $-\text{SO}-$ or $-\text{SO}_2-$, and

Z^{2a} is (i) an optionally substituted heterocyclic group,

20 (ii) $-\text{NR}^{20a}(\text{CR}^{21a}\text{R}^{22a}\text{R}^{23a})$ (wherein

(a) R^{20a} is H or an optionally substituted hydrocarbon
group; and R^{21a} is an optionally substituted heterocyclic

group which may be fused with an optionally substituted benzene ring, or an optionally substituted phenyl group which may be fused with an optionally substituted aromatic heterocyclic ring and R^{22a} and R^{23a} are the same or different and are an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group or R^{22a} and R^{23a} may be combined to form a ring, or

(b) R^{20a} is H or an optionally substituted hydrocarbon group; and R^{21a} , R^{22a} and R^{23a} are the same or different and are an optionally substituted C_{1-8} aliphatic hydrocarbon group, provided that the sum total of the number of carbon atoms is 7 or more),

(iii) $-NR^{20a}R^{25a}$ (wherein R^{20a} is as defined above and R^{25a} is an optionally substituted C_{6-10} aryl- C_{2-4} alkyl, C_{6-10} aryloxy- C_{2-4} alkyl, C_{6-10} arylamino- C_{2-4} alkyl, C_{7-14} aralkylamino- C_{2-4} alkyl, heterocyclic ring- C_{2-4} alkyl or heterocyclic group),

(iv) a substituted 5- to 7-membered cyclic amino group,

or

(v) $-OR^{24a}$ (wherein R^{24a} is

(a) an optionally substituted C_{7-14} aralkyl group,

(b) an optionally substituted C_{3-7} alicyclic hydrocarbon group,

(c) an optionally substituted C_{7-24} aliphatic hydrocarbon

group, or

(d) an optionally substituted heterocyclic group);

R^3 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ is $-CO-$, $-CS-$, $-SO-$ or $-SO_2-$, and Z^2 is an optionally substituted hydrocarbon group, an optionally substituted heterocyclic group, an optionally substituted hydroxyl group, or an optionally substituted amino group);

Y is C, CR^4 (wherein R^4 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above)) or N;

R^8 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above);

Ar is an optionally substituted cyclic group;

R^9 and R^{10} are the same or different and are H, an

optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above), or R^9 and R^{10} may be combined to form an oxo group, methylene group or a ring;

X^3 is a bond, oxygen atom, an optionally oxidized sulfur atom, N, $NR^{7'}$ (wherein $R^{7'}$ is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted heterocyclic group, or a group of the formula $-Z^{1'}-Z^2$ (wherein $-Z^{1'}-$ is $-CS-$, $-SO-$ or $-SO_2-$, and Z^2 is as defined above)), or an optionally substituted bivalent C_{1-2} hydrocarbon group; and

- - - is a single bond or a double bond;

provided that at least one of R^9 and R^{10} is $CHR^{15}R^{16}$ (wherein R^{15} and R^{16} are the same or different and are H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above)) and the other is other than an optionally substituted phenyl group; or a salt thereof.

12. The compound according to claim 11, wherein R^{1a} is a group of the formula: $-\text{CONR}^{20a}(\text{CR}^{21b}\text{R}^{22b}\text{R}^{23b})$ (wherein R^{20a} is as defined in claim 11 and at least one of R^{21b} , R^{22b} , and R^{23b} is an optionally substituted heterocyclic group which
5 may be fused with an optionally substituted benzene ring, or an optionally substituted phenyl group which may be fused with an optionally substituted aromatic heterocyclic ring).

13. The compound according to claim 11, wherein R^{1a}
10 is (1) an optionally substituted 5- to 7-membered aromatic or non-aromatic heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, or

(2) a group of the formula: $-\text{CO}-\text{Z}^{2c}$ (wherein Z^{2c} is

15 (i) an optionally substituted 5- to 7-membered aromatic or non-aromatic heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom,

(ii) $-\text{NR}^{20c}(\text{CR}^{21c}\text{R}^{22c}\text{R}^{23c})$ (wherein

(a) R^{20c} is H or an optionally substituted hydrocarbon

20 group selected from C_{1-8} saturated aliphatic hydrocarbon group, C_{2-8} unsaturated aliphatic hydrocarbon group, C_{3-7}

saturated alicyclic hydrocarbon group, C_{3-7} unsaturated

alicyclic hydrocarbon group, C_{9-10} partly saturated and

fused bicyclic hydrocarbon group, C_{3-7} saturated or

25 unsaturated alicyclic- C_{1-8} saturated or unsaturated

aliphatic hydrocarbon group, C₉₋₁₀ partly saturated and fused bicyclic hydrocarbon-C₁₋₄ alkyl group, C₉₋₁₀ partly saturated and fused bicyclic hydrocarbon-C₂₋₄ alkenyl group, C₆₋₁₀ aryl group and C₇₋₁₄ aralkyl group; and R^{21c} is

5 1) an optionally substituted 5- to 7-membered aromatic or non-aromatic heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, which may be fused with an optionally substituted benzene ring, or 2) an optionally

10 substituted C₆₋₁₀ aryl group which may be fused with an optionally substituted 5- to 7-membered aromatic heterocyclic ring having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom; and R^{22c} and R^{23c} are the same or different and are an optionally

15 substituted hydrocarbon group selected from C₁₋₈ saturated aliphatic hydrocarbon group, C₂₋₈ unsaturated aliphatic hydrocarbon group, C₃₋₇ saturated alicyclic hydrocarbon group, C₃₋₇ unsaturated alicyclic hydrocarbon group, C₉₋₁₀ partly saturated and fused bicyclic

20 hydrocarbon group, C₃₋₇ saturated or unsaturated alicyclic-C₁₋₈ saturated or unsaturated aliphatic hydrocarbon group, C₉₋₁₀ partly saturated and fused bicyclic hydrocarbon-C₁₋₄ alkyl group, C₉₋₁₀ partly saturated and fused bicyclic hydrocarbon-C₂₋₄ alkenyl

25 group, C₆₋₁₀ aryl group and C₇₋₁₄ aralkyl group or an

optionally substituted 5- to 7-membered aromatic or non-aromatic heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, or R^{22c} and R^{23c} may be combined to form a C_{3-7} carbon ring, or (b) R^{20c} is H or an optionally substituted hydrocarbon group selected from C_{1-8} saturated aliphatic hydrocarbon group, C_{2-8} unsaturated aliphatic hydrocarbon group, C_{3-7} saturated alicyclic hydrocarbon group, C_{3-7} unsaturated alicyclic hydrocarbon group, C_{9-10} partly saturated and fused bicyclic hydrocarbon group, C_{3-7} saturated or unsaturated alicyclic- C_{1-8} saturated or unsaturated aliphatic hydrocarbon group, C_{9-10} partly saturated and fused bicyclic hydrocarbon- C_{1-4} alkyl group, C_{9-10} partly saturated and fused bicyclic hydrocarbon- C_{2-4} alkenyl group, C_{6-10} aryl group and C_{7-14} aralkyl group; and R^{21c} , R^{22c} and R^{23c} are the same or different and are an optionally substituted C_{1-8} aliphatic hydrocarbon group, provided that the sum total of the number of carbon atoms is 7 or more),

- (iii) $-NR^{20c}R^{25c}$ (wherein R^{20c} is as defined above and R^{25c} is an optionally substituted C_{6-10} aryl- C_{2-4} alkyl, C_{6-10} aryloxy- C_{2-4} alkyl, C_{6-10} arylamino- C_{2-4} alkyl, C_{7-14} aralkylamino- C_{2-4} alkyl, 5- to 7-membered heterocyclic ring (having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom)- C_{2-4} alkyl or 5- to 7-

membered heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom),

(iv) a substituted 5- to 7-membered cyclic amino group, or

5

(v) $-OR^{24c}$ (wherein R^{24c} is

(a) an optionally substituted C_{7-14} aralkyl group,

(b) an optionally substituted C_{3-7} alicyclic hydrocarbon group,

10 (c) an optionally substituted C_{7-24} aliphatic hydrocarbon group, or

(d) an optionally substituted 5- to 7-membered aromatic or non-aromatic heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom;

15 wherein said substituents for R^{1a} , Z^{2c} , R^{20c} , R^{21c} , R^{22c} , R^{23c} , R^{24c} and R^{25c} are 1 to 3 substituents selected from the group consisting of

1) C_{1-6} alkyl,

2) C_{2-6} alkenyl,

20 3) C_{2-6} alkynyl,

4) C_{3-7} cycloalkyl,

5) C_{6-10} aryl which may be substituted with 1 to 3 substituents selected from the group consisting of C_{1-6} alkyl, amino, $N-(C_{1-6} \text{ alkyl})$ amino, N,N -di- $(C_{1-6} \text{ alkyl})$ amino,

25 amidino, carbamoyl, $N-(C_{1-6} \text{ alkyl})$ carbamoyl, N,N -di- $(C_{1-6}$

alkyl)carbamoyl, sulfamoyl, N-(C₁₋₆ alkyl)sulfamoyl, N,N-di-(C₁₋₆ alkyl)sulfamoyl, carboxyl, C₂₋₇ alkoxy-carbonyl, hydroxyl, C₁₋₆ alkoxy, mercapto, C₁₋₆ alkylthio, sulfo, cyano, azido, halogen, nitro, nitroso, phosphono, C₁₋₆ alkoxyphosphoryl, di-(C₁₋₆ alkoxy)phosphoryl and C₁₋₆ alkyl substituted with phosphono, C₁₋₆ alkoxyphosphoryl and di-(C₁₋₆ alkoxy)phosphoryl (hereinafter the group of 5) is referred to as group "C"),

6) aromatic heterocyclic group selected from (a) aromatic 5- or 6-membered heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, (b) fused bicyclic heterocyclic group formed by condensation of an aromatic 5- or 6-membered heterocyclic group having 1 to 3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom with benzene ring or an aromatic 5- or 6-membered heterocyclic group having 1 to 3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom and (c) fused tricyclic heterocyclic group formed by condensation of [1] an aromatic 5- or 6-membered heterocyclic group having 1-3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, [2] benzene ring, and [3] an aromatic 5- or 6-membered heterocyclic group having 1-3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom or benzene ring,

- 7) heterocyclic-oxy group formed by combining each of the above aromatic heterocyclic groups (a), (b) and (c) with oxy group,
- 8) non-aromatic 4- or 7-membered heterocyclic group having 1 to 3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom,
- 9) C₇₋₁₄ aralkyl which may be substituted with 1 to 3 substituents selected from the group "C",
- 10) amino group,
- 10 11) N-mono-substituted amino selected from N-(C₁₋₆ alkyl)amino, N-(C₂₋₆ alkenyl)amino, N-(C₃₋₇ cycloalkyl)amino group and N-(C₆₋₁₀ aryl)amino which may be substituted with 1 to 3 substituents selected from the group "C",
- 15 12) amino substituted with two substituents selected from C₁₋₆ alkyl, C₂₋₆ alkenyl, C₃₋₇ cycloalkenyl and C₆₋₁₀ aryl which may be substituted with 1 to 3 substituents selected from the group "C",
- 13) amidino,
- 20 14) acyl selected from C₂₋₈ alkanoyl, C₃₋₈ alkenoyl, C₃₋₇ cycloalkyl-carbonyl, C₃₋₇ cycloalkenyl-carbonyl, C₆₋₁₀ aryl-carbonyl which may be substituted with 1 to 3 substituents selected from the group "C", and heterocyclic-carbonyl formed by binding of an aromatic or
- 25 non-aromatic 5- or 6-membered heterocyclic group having

1-3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom with carbonyl,

15) carbamoyl,

16) mono-substituted carbamoyl group selected from N-(C₁₋₆ alkyl)carbamoyl, N-(C₂₋₆ alkenyl)carbamoyl, N-(C₃₋₇ cycloalkyl)carbamoyl and N-(C₆₋₁₀ aryl)carbamoyl which may be substituted with 1 to 3 substituents selected from the group "C",

17) carbamoyl substituted with two substituents selected from C₁₋₆ alkyl, C₂₋₆ alkenyl, C₃₋₇ cycloalkyl and C₆₋₁₀ aryl which may be substituted with 1 to 3 substituents selected from the group "C",

18) sulfamoyl,

19) N-mono-substituted sulfamoyl selected from N-(C₁₋₆ alkyl)sulfamoyl, N-(C₂₋₆ alkenyl)sulfamoyl, N-(C₃₋₇ cycloalkyl)sulfamoyl and N-(C₆₋₁₀ aryl)sulfamoyl which may be substituted with 1 to 3 substituents selected from the group "C",

20) sulfamoyl substituted with two substituents selected from C₁₋₆ alkyl, C₂₋₆ alkenyl, C₃₋₇ cycloalkyl and C₆₋₁₀ aryl which may be substituted with 1 to 3 substituents selected from the group "C",

21) carboxyl,

22) C₁₋₆ alkoxy-carbonyl,

23) hydroxyl,

- 24) C₁₋₆ alkoxy,
- 25) C₂₋₁₀ alkenyloxy,
- 26) C₃₋₇ cycloalkyloxy,
- 27) C₆₋₁₀ aryloxy which may be substituted with 1 to 3
5 substituents selected from the group "C",
- 28) C₇₋₁₄ aralkyloxy which may be substituted with 1 to 3
substituents selected from the group "C",
- 29) mercapto,
- 30) C₁₋₆ alkylthio,
- 10 31) C₇₋₁₄ aralkylthio which may be substituted with 1 to 3
substituents selected from the group "C",
- 32) C₆₋₁₀ arylthio which may be substituted with 1 to 3
substituents selected from the group "C",
- 33) C₁₋₆ alkylsulfinyl,
- 15 34) C₇₋₁₄ aralkylsulfinyl which may be substituted with 1
to 3 substituents selected from the group "C",
- 35) C₆₋₁₀ arylsulfinyl which may be substituted with 1 to
3 substituents selected from the group "C",
- 36) C₁₋₆ alkylsulfonyl,
- 20 38) C₇₋₁₄ aralkylsulfonyl which may be substituted with 1
to 3 substituents selected from the group "C",
- 39) C₆₋₁₀ arylsulfonyl which may be substituted with 1 to
3 substituents selected from the group "C",
- 40) sulfo,
- 25 41) cyano,

42) azido,

43) halogen,

44) nitro,

45) nitroso,

5 46) phosphono,

47) C₁₋₆ alkoxy-phosphoryl

48) di-C₁₋₆ alkoxy-phosphoryl,

49) C₁₋₆ alkyl substituted with phosphono, C₁₋₆ alkoxyphosphoryl or di-(C₁₋₆ alkoxy)phosphoryl

10 50) C₁₋₆ alkyl substituted with 1 to 4 halogen atoms

51) C₁₋₆ alkoxy substituted with 1 to 4 halogen atoms and

52) C₁₋₆ alkylenedioxy

(hereinafter the group of above 1) to 52) is referred to as group "B");

15 R³ is H, a C₁₋₆ alkyl group or a C₇₋₁₄ aralkyl group;

Y is CH;

R⁸ is H, a C₁₋₆ alkyl group, a C₁₋₆ alkylthio group or a C₁₋₆ alkoxy group which may be substituted with hydroxyl group;

Ar is (1) a C₆₋₁₀ aryl group, (2) a 5- to 7-membered aromatic or non-aromatic heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, or (3) a C₃₋₇ saturated or unsaturated alicyclic hydrocarbon group, each of which may be substituted with 1 to 3 substituents selected from the group "B";

25

one of R^9 and R^{10} is a hydrogen atom or C_{1-6} alkyl group which may be substituted with 1 to 3 substituents selected from the group "B" and the other is (1) a hydrocarbon group selected from C_{1-8} saturated aliphatic hydrocarbon group, C_{2-8} unsaturated aliphatic hydrocarbon group, C_{3-7} saturated alicyclic hydrocarbon group, C_{3-7} unsaturated alicyclic hydrocarbon group, C_{9-10} partly saturated and fused bicyclic hydrocarbon group, C_{3-7} saturated or unsaturated alicyclic- C_{1-8} saturated or unsaturated aliphatic hydrocarbon group, C_{9-10} partly saturated and fused bicyclic hydrocarbon- C_{1-4} alkyl group, C_{9-10} partly saturated and fused bicyclic hydrocarbon- C_{2-4} alkenyl group, C_{6-10} aryl group and C_{7-14} aralkyl group, each of which may be substituted with 1 to 3 substituents selected from the group "B" or (2) a 5- to 7-membered aromatic or non-aromatic heterocyclic group having 1-4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, which may be substituted with 1 to 3 substituents selected from the group "B", or R^9 and R^{10} may be combined to form a C_{5-7} carbon ring; and X^3 is CH_2 .

14. The compound according to claim 8, wherein R^1 is a group of the formula: $-CONR^{20}(CR^{21}R^{22}R^{23})$ (wherein R^{20} is H, and R^{21} , R^{22} , and R^{23} are the same or different and are an optionally substituted hydrocarbon group or an optionally substituted heterocyclic group); R^3 is H; Ar is an

optionally substituted aromatic ring group; X^3 is CH_2 ; Y is CH; R^8 is H or an optionally substituted hydrocarbon group, an optionally substituted alkoxy group, an optionally substituted sulfanyl group, an optionally substituted sulfinyl group, or an optionally substituted sulfonyl group, C_{1-6} alkoxy-carbonyl; and R^9 and R^{10} are the same or different and are an optionally substituted hydrocarbon group.

15. The compound according to claim 14, wherein at least one of R^{21} , R^{22} , and R^{23} is an optionally substituted heterocyclic group or an optionally substituted phenyl group.

16. The compound according to claim 14, wherein R^{20} and R^{21} are combined to form an optionally substituted 5- to 7-membered ring, and R^{22} and R^{23} are the same or different and are an optionally substituted hydrocarbon group, an optionally substituted heterocyclic group, or an optionally substituted phenyl group.

17. The compound according to claim 14, wherein R^{21} and R^{22} are the same or different and are a C_{1-8} hydrocarbon group, and R^{23} is an optionally substituted 5-membered heterocyclic group which may be fused with an optionally substituted benzene ring, or an optionally substituted phenyl group.

18. The compound according to claim 16, wherein R^{20}

and R²¹ are combined to form a 5- or 6-membered ring which may be fused with benzene ring and/or substituted with 1 to 3 substituents selected from the group consisting of (1) halogen, (2) hydrogen, (3) a phenoxy which may be substituted with 1 to 3 substituents selected from halogen, hydroxyl, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ acyl, cyano, amino, mono-C₁₋₆ alkyl-amino, di-C₁₋₆ alkyl-amino, C₁₋₆ alkyl-sulfanyl, C₁₋₆ alkyl-sulfinyl, C₁₋₆ alkyl-sulfonyl, C₁₋₆ alkoxy-carbonyl, carbamoyl, N-C₁₋₆ alkyl-carbamoyl and N,N-di-C₁₋₆ alkyl-carbamoyl,

(4) C₁₋₆ alkoxy which may be substituted with 1 to 3 substituents selected from halogen, hydroxyl, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ acyl, cyano, amino, mono-C₁₋₆ alkyl-amino, di-C₁₋₆ alkyl-amino, C₁₋₆ alkyl-sulfanyl, C₁₋₆ alkyl-sulfinyl, C₁₋₆ alkyl-sulfonyl, C₁₋₆ alkoxy-carbonyl, carbamoyl, N-C₁₋₆ alkyl-carbamoyl, N,N-di-C₁₋₆ alkyl-carbamoyl and phenyl which may be substituted with 1 to 3 substituents selected from halogen, hydroxyl, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ acyl, cyano, halogeno C₁₋₆ alkyl, amino, mono-C₁₋₆ alkyl-amino, di-C₁₋₆ alkyl-amino, C₁₋₆ alkyl-sulfanyl, C₁₋₆ alkyl-sulfinyl, C₁₋₆ alkyl-sulfonyl, C₁₋₆ alkoxy-carbonyl, carbamoyl, N-C₁₋₆ alkyl-carbamoyl and N,N-di-C₁₋₆ alkyl-carbamoyl,

and (5) a C₁₋₈ hydrocarbon group which may be substituted with 1 to 3 substituents selected from halogen, hydroxyl, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ acyl, cyano, amino, mono-C₁₋₆

alkyl-amino, di-C₁₋₆ alkyl-amino, C₁₋₆ alkyl-sulfanyl, C₁₋₆ alkyl-sulfinyl, C₁₋₆ alkyl-sulfonyl, C₁₋₆ alkoxy-carbonyl, carbamoyl, N-C₁₋₆ alkyl-carbamoyl, N,N-di-C₁₋₆ alkyl-carbamoyl and phenyl which may be substituted with 1 to 3 substituents selected from halogen, hydroxyl, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ acyl, cyano, halogeno C₁₋₆ alkyl, amino, mono-C₁₋₆ alkyl-amino, di-C₁₋₆ alkyl-amino, C₁₋₆ alkyl-sulfanyl, C₁₋₆ alkyl-sulfinyl, C₁₋₆ alkyl-sulfonyl, C₁₋₆ alkoxy-carbonyl, carbamoyl, N-C₁₋₆ alkyl-carbamoyl and N,N-di-C₁₋₆ alkyl-carbamoyl, and R²² and R²³ are the same or different and C₁₋₈ hydrocarbon group which may be substituted with 1 to 3 substituents selected from halogen, hydroxyl, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ acyl, cyano, amino, mono-C₁₋₆ alkyl-amino, di-C₁₋₆ alkyl-amino, C₁₋₆ alkyl-sulfanyl, C₁₋₆ alkyl-sulfinyl, C₁₋₆ alkyl-sulfonyl, C₁₋₆ alkoxy-carbonyl, carbamoyl, N-C₁₋₆ alkyl-carbamoyl, N,N-di-C₁₋₆ alkyl-carbamoyl and phenyl which may be substituted with 1 to 3 substituents selected from halogen, hydroxyl, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ acyl, cyano, halogeno C₁₋₆ alkyl, amino, mono-C₁₋₆ alkyl-amino, di-C₁₋₆ alkyl-amino, C₁₋₆ alkyl-sulfanyl, C₁₋₆ alkyl-sulfinyl, C₁₋₆ alkyl-sulfonyl, C₁₋₆ alkoxy-carbonyl, carbamoyl, N-C₁₋₆ alkyl-carbamoyl and N,N-di-C₁₋₆ alkyl-carbamoyl.

19. N-(1-ethyl-1-(4-methylphenyl)propyl)-7,7-dimethyl-5-phenyl-4,5,6,7-tetrahydropyrazolo[1,5-

a]pyrimidine-3-carboxamide or a salt thereof,

N-(1-ethyl-1-(4-methylphenyl)propyl)-5-(2-fluorophenyl)-
7,7-dimethyl-4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine-3-
carboxamide or a salt thereof,

5 N-(1-ethyl-1-(4-methylphenyl)propyl)-2,7,7-trimethyl-5-
phenyl-4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine-3-
carboxamide or a salt thereof,

N-(1-ethyl-1-(4-ethylphenyl)propyl)-2,7,7-trimethyl-5-
phenyl-4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine-3-

10 carboxamide or a salt thereof,

N-(1-ethyl-1-(4-methylphenyl)propyl)-5-(2-fluorophenyl)-
2,7,7-trimethyl-4,5,6,7-tetrahydropyrazolo[1,5-
a]pyrimidine-3-carboxamide or a salt thereof,

N-(1-ethyl-1-(4-ethylphenyl)propyl)-5-(2-fluorophenyl)-

15 2,7,7-trimethyl-4,5,6,7-tetrahydropyrazolo[1,5-
a]pyrimidine-3-carboxamide or a salt thereof,

5-(2-chlorophenyl)-N-(1-ethyl-1-(4-methylphenyl)propyl)-
2,7,7-trimethyl-4,5,6,7-tetrahydropyrazolo[1,5-
a]pyrimidine-3-carboxamide or a salt thereof,

20 N-(1-(4-(dimethylamino)phenyl)-1-ethylpropyl)-5-(2-
fluorophenyl)-2,7,7-trimethyl-4,5,6,7-
tetrahydropyrazolo[1,5-a]pyrimidine-3-carboxamide or a salt
thereof,

N-(1,1-diethylbutyl)-5-(2-fluorophenyl)-2,7,7-trimethyl-

25 4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine-3-carboxamide

or a salt thereof,

N-(1-ethyl-1-phenylpropyl)-5-(2-fluorophenyl)-2,7,7-trimethyl-4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine-3-carboxamide or a salt thereof,

5 3-(5-(1-ethyl-1-(4-methylphenyl)propyl)-1,3,4-oxadiazol-2-yl)-2,7,7-trimethyl-5-phenyl-4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine or a salt thereof,

3-(5-(1-ethyl-1-(4-methylphenyl)propyl)-1,3,4-thiadiazol-2-yl)-2,7,7-trimethyl-5-phenyl-4,5,6,7-

10 tetrahydropyrazolo[1,5-a]pyrimidine or a salt thereof,

3-((4-(benzyloxy)-2,2-diethyl-1-pyrrolidinyl)carbonyl)-7,7-dimethyl-5-phenyl-4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine or a salt thereof,

15 3-((2,2-diethyl-4-methoxy-1-pyrrolidinyl)carbonyl)-7,7-dimethyl-5-phenyl-4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine or a salt thereof, or

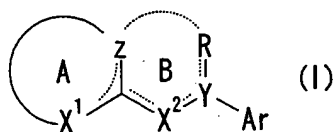
3-((2,2-diethyl-4-fluoro-1-pyrrolidinyl)carbonyl)-7,7-dimethyl-5-phenyl-4,5,6,7-tetrahydropyrazolo[1,5-a]pyrimidine or a salt thereof.

20 20. The compound according to claim 19, which is an optically active compound.

21. A prodrug of the compound according to claim 1, 2 or 13.

25 22. A pharmaceutical composition which comprises the compound according to claim 1, 2 or 13 or a prodrug thereof.

23. A composition for modulating calcium receptor which comprises a compound of the formula (I):



wherein ring A is an optionally substituted 5- to 7-membered ring;

ring B is an optionally substituted 5- to 7-membered heterocyclic ring;

X^1 is CR^1 (wherein R^1 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ is $-CO-$, $-CS-$, $-SO-$ or $-SO_2-$, and Z^2 is an optionally substituted hydrocarbon group, an optionally substituted heterocyclic group, an optionally substituted hydroxyl group, or an optionally substituted amino group)), CR^1R^2 (wherein R^1 is as defined above, R^2 is H or an optionally substituted hydrocarbon group), N or NR^{13} (wherein R^{13} is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as

defined above));

X^2 is N or NR^3 (wherein R^3 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, cyano group, a
 5 halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above));

Y is C, CR^4 (wherein R^4 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group,
 10 an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above)) or N;

15 Z is CR^5 (wherein R^5 is H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol group, cyano group, a halogen atom, an optionally substituted heterocyclic group, or a group of
 20 the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above)), CR^5R^6 (wherein R^5 and R^6 are the same or different and are H, an optionally substituted hydrocarbon group, an optionally substituted hydroxyl group, an optionally substituted amino group, an optionally substituted thiol
 25 group, cyano group, a halogen atom, an optionally

substituted heterocyclic group, or a group of the formula:
 $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as defined above)), N or NR^7
 (wherein R^7 is H, an optionally substituted hydrocarbon
 group, an optionally substituted hydroxyl group, an
 5 optionally substituted amino group, cyano group, a halogen
 atom, an optionally substituted heterocyclic group, or a
 group of the formula: $-Z^1-Z^2$ (wherein $-Z^1-$ and Z^2 are as
 defined above));

Ar is an optionally substituted cyclic group;

10 R is H, an optionally substituted hydrocarbon group, an
 optionally substituted hydroxyl group, an optionally
 substituted amino group, an optionally substituted thiol
 group, an optionally substituted sulfonyl group or an
 optionally substituted sulfinyl group, or R and Z may be
 15 combined to form a ring B; and

- - - is a single bond or a double bond;

or a salt thereof or a prodrug thereof.

24. The composition according to claim 23, which is a
 calcium receptor antagonist.

20 25. The composition according to claim 23, which is
 an agent for preventing or treating diseases caused by
 abnormality of calcium concentration in a living body or a
 calcium receptor.

25 26. The composition according to claim 23, which is
 an agent for preventing or treating bone diseases.

27. The composition according to claim 23, which is an agent for preventing or treating osteoporosis or fracture.

28. A method for modulating a calcium receptor which
5 comprises administering to a mammal an effective amount of a compound of the formula (I) or a salt thereof or a prodrug thereof according to claim 23.

29. A method for preventing or treating bone diseases, which comprises administering to a mammal an effective
10 amount of a compound of the formula (I) or a salt thereof or a prodrug thereof according to claim 23.

30. Use of the compound of the formula (I) or a salt thereof or a prodrug thereof according to claim 23 for producing a calcium receptor modulator.

15 31. Use of the compound of the formula (I) or a salt thereof or a prodrug thereof according to claim 23 for producing a composition for preventing or treating bone diseases.